

# PanaFlow Z1G

*General-Purpose Gas Flowmeter (1 Channel)*

User Manual



imagination at work

910-310U Rev. A  
April 2014



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## Information Paragraphs

**Note:** *These paragraphs provide information that provides a deeper understanding of the situation, but is not essential to the proper completion of the instructions.*

**IMPORTANT:** *These paragraphs provide information that emphasizes instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.*



**CAUTION!** This symbol indicates a risk of potential minor personal injury and/or severe damage to the equipment, unless these instructions are followed carefully.



**WARNING!** This symbol indicates a risk of potential serious personal injury, unless these instructions are followed carefully.

## Safety Issues



**WARNING!** It is the responsibility of the user to make sure all local, county, state and national codes, regulations, rules and laws related to safety and safe operating conditions are met for each installation.

## Auxiliary Equipment

### Local Safety Standards

The user must make sure that he operates all auxiliary equipment in accordance with local codes, standards, regulations, or laws applicable to safety.

### Working Area



**WARNING!** Auxiliary equipment may have both manual and automatic modes of operation. As equipment can move suddenly and without warning, do not enter the work cell of this equipment during automatic operation, and do not enter the work envelope of this equipment during manual operation. If you do, serious injury can result.



**WARNING!** Make sure that power to the auxiliary equipment is turned OFF and locked out before you perform maintenance procedures on the equipment.

## Auxiliary Equipment (cont.)

### Qualification of Personnel

Make sure that all personnel have manufacturer-approved training applicable to the auxiliary equipment.

### Personal Safety Equipment

Make sure that operators and maintenance personnel have all safety equipment applicable to the auxiliary equipment. Examples include safety glasses, protective headgear, safety shoes, etc.

### Unauthorized Operation

Make sure that unauthorized personnel cannot gain access to the operation of the equipment.

## Environmental Compliance

### Waste Electrical and Electronic Equipment (WEEE) Directive

GE Measurement & Control Solutions is an active participant in Europe's *Waste Electrical and Electronic Equipment* (WEEE) take-back initiative, directive 2012/19/EU.



The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

Visit <http://www.ge-mcs.com/en/about-us/environmental-health-and-safety/1741-weee-req.html> for take-back instructions and more information about this initiative.

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# Chapter 1. Installation

## 1.1 Introduction

To ensure safe and reliable operation of the Model Z1G Ultrasonic Flowmeter, the system must be installed in accordance with the guidelines established by GE engineers. Those guidelines, which are explained in detail in this chapter, include the following specific topics:

- Unpacking the Model PanaFlow Z1G system
- Selecting suitable sites for the electronics enclosure and the flowcell/transducers
- Installing the flowcell

**Note:** *See the enclosed Transducer Installation Guide for detailed instructions on transducer installation.*

- Installing optional temperature and pressure transmitters

**WARNING!** The Model PanaFlow Z1G flow transmitter can measure the flow rate of many gases, some of which are potentially hazardous. In such cases, the importance of proper safety practices cannot be overemphasized.

Be sure to follow all applicable local safety codes and regulations for installing electrical equipment and working with hazardous gases or flow conditions. Consult company safety personnel or local safety authorities to verify the safety of any procedure or practice.

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**!ATTENTION EUROPEAN CUSTOMERS!**

To meet CE Mark requirements, all cables must be installed as described in Appendix A,  
*CE Mark Compliance.*

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## 1.2 Unpacking

Carefully remove the electronics enclosure, the transducers, and the cables from the shipping containers. Before discarding any of the packing materials, account for all components and documentation listed on the packing slip. The discarding of an important item along with the packing materials is all too common. If anything is missing or damaged, contact the factory immediately for assistance.

**Note:** *For compliance with the European Union's Low Voltage Directive (2006/95/EC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the Model PanaFlow Z1G.*

## 1.3 Lifting Instructions

Use proper lifting techniques when moving the PanaFlow Z1G. No lifting hooks or eyelets are provided. The recommended method for lifting the PanaFlow Z1G is by using lifting straps on each side of the pressure vessel with a stabilizer bar between them, located above the transmitter head. Additional care may need to be taken to prevent the transmitter from rotating, especially on the smaller systems where the transmitter weight is a larger percentage of the total system weight.



**WARNING!** Never stand below any object being lifted.



Figure 1: Proper Lifting Recommendation



**WARNING!** Do not use the transmitter to support the weight of the flowcell as shown in Figure 2 below. The transmitter cannot support the weight of the pressure vessel.



Figure 2: Improper Lifting Technique

## 1.4 Flowcell Location

The pipeline flowcell consists of the flow rate transducers and any pressure and/or temperature transducers employed as part of the flow measurement system. Ideally, choose a section of pipe with unlimited access to the flowcell; for example, a long stretch of pipe that is above ground.

1. There should be at least 20 pipe diameters of straight, undisturbed flow upstream and 10 pipe diameters of straight, undisturbed flow downstream from the measurement point. To ensure undisturbed flow, avoid sources of turbulence in the fluid such as valves, flanges, expansions and elbows; and dips or low spots in which condensed liquid may collect.
2. Because condensate or sediment at the bottom of the pipe may cause attenuation of the ultrasonic signal, locate the transducers on the side of a horizontal pipe, when possible. If limited pipe access necessitates top-mounted transducers and the sound beam path includes a reflection, shift the transducers to at least 10° off top dead center. This will minimize the influence of any sediment on the reflected ultrasonic signals.

### 1.4.1 Temperature and Pressure Transmitters

When installing temperature and/or pressure transmitters in the flowcell, locate them downstream of the transducers. These transmitters should be positioned no closer to the Model PanaFlow Z1G transducers than 2 pipe diameters and no further away from the transducers than 20 pipe diameters.

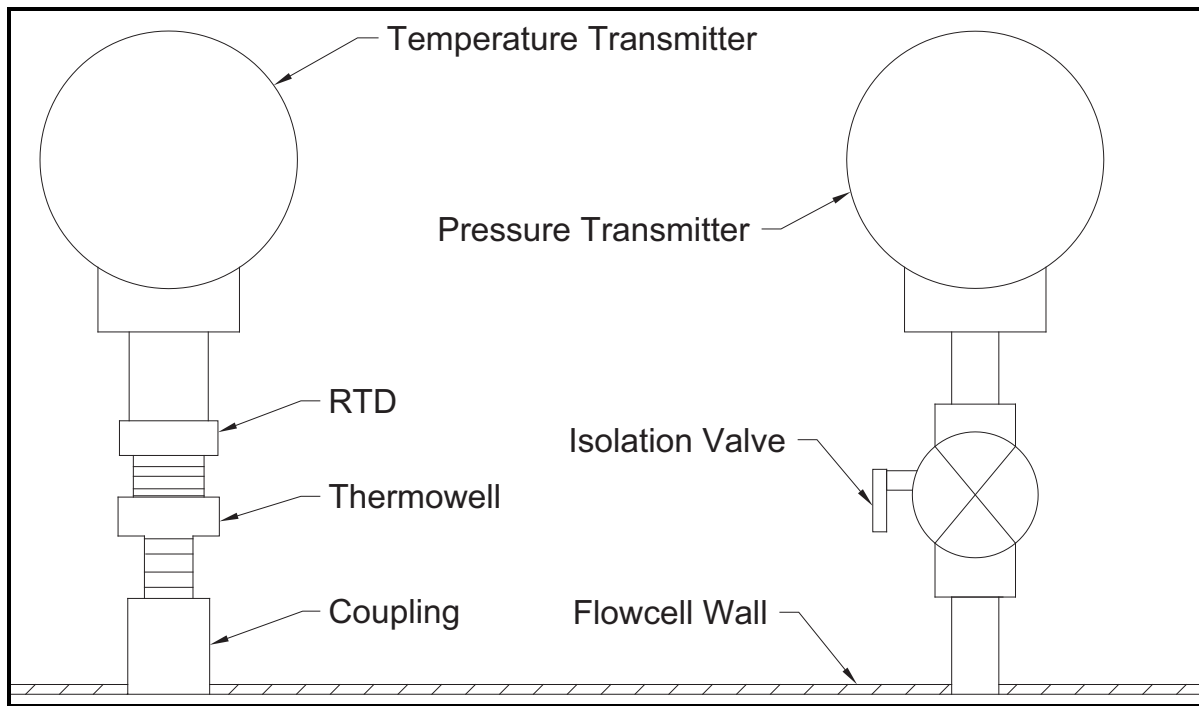
## 1.5 Installing Temperature and Pressure Transmitters

Optional temperature and pressure transmitters may be installed near the ultrasonic transducer ports as part of the flowcell. Be sure to observe the siting requirements given earlier in this chapter. These transmitters should send a 0/4-20 mA signal to the Z1G. In turn, the Z1G must be fitted with a suitable option card to process the signals and to provide the required 24 VDC power to the transmitters. Any desired transmitters or sensors may be used, but they must have an accuracy equal to 0.5% of the reading or better.

**Note:** *Resistive Thermal Devices (RTDs) are a good choice for measuring the temperature.*

Typically, a 1/2" or 3/4" NPT female threaded port is used to mount the transmitters on the flowcell. If the pipeline is insulated, the coupling may need to be extended to provide convenient access. Of course, other types of mounting ports, including flanged ports, may be used for the transmitters.

Figure 3 shows a typical mounting arrangement for the pressure and temperature transmitters. The temperature sensor should protrude 1/4 to 1/2 way into the pipe.



**Figure 3: Typical Temperature/Pressure Transmitter Mounting**

**WARNING!** Proper grounding of the PanaFlow Z1G chassis is required to prevent the possibility of electric shock. See Figure 9 on page 22 for the location of the chassis grounding screw.

**IMPORTANT:** *Since the IREX keys do not work properly in direct sunlight, be sure to position the PanaFlow Z1G with an optional sunshield or out of direct sunlight.*

## 1.6 Making the Electrical Connections

This section contains instructions for making all the necessary electrical connections to the Model PanaFlow Z1G flow transmitter. Refer to Figure 9 on page 22 for a complete wiring diagram.

Except for the power connector, all electrical connectors are stored on their terminal blocks during shipment and may be removed from the enclosure for more convenient wiring. Simply, feed the cables through the conduit holes on the side of the enclosure, attach the wires to the appropriate connectors and plug the connectors back onto their terminal blocks.

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To meet CE Mark requirements, all cables must be installed as described in Appendix A,  
*CE Mark Compliance.*

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Refer to Figure 4 on page 6 and prepare the PanaFlow Z1G for wiring by completing the following steps:

## 1.6 Making the Electrical Connections (cont.)

**WARNING!** Always disconnect the line power from the Model PanaFlow Z1G before removing either the front cover or the rear cover. This is especially important in a hazardous environment.

1. Disconnect any existing power line from its source.
2. Loosen the set screw on the rear cover.
3. Place a rod or long screwdriver across the cover in the slots provided, and rotate the cover counterclockwise until it comes free from the enclosure.
4. Install any required cable clamps in the appropriate conduit holes around the side of the enclosure.
5. Note the labels inside the rear cover to assist in wiring the power and option card connections. Also, Figure 5 on page 12 shows the rear cover option card labels for every available option card configuration.

Proceed to the appropriate section of this chapter to make the desired wiring connections.

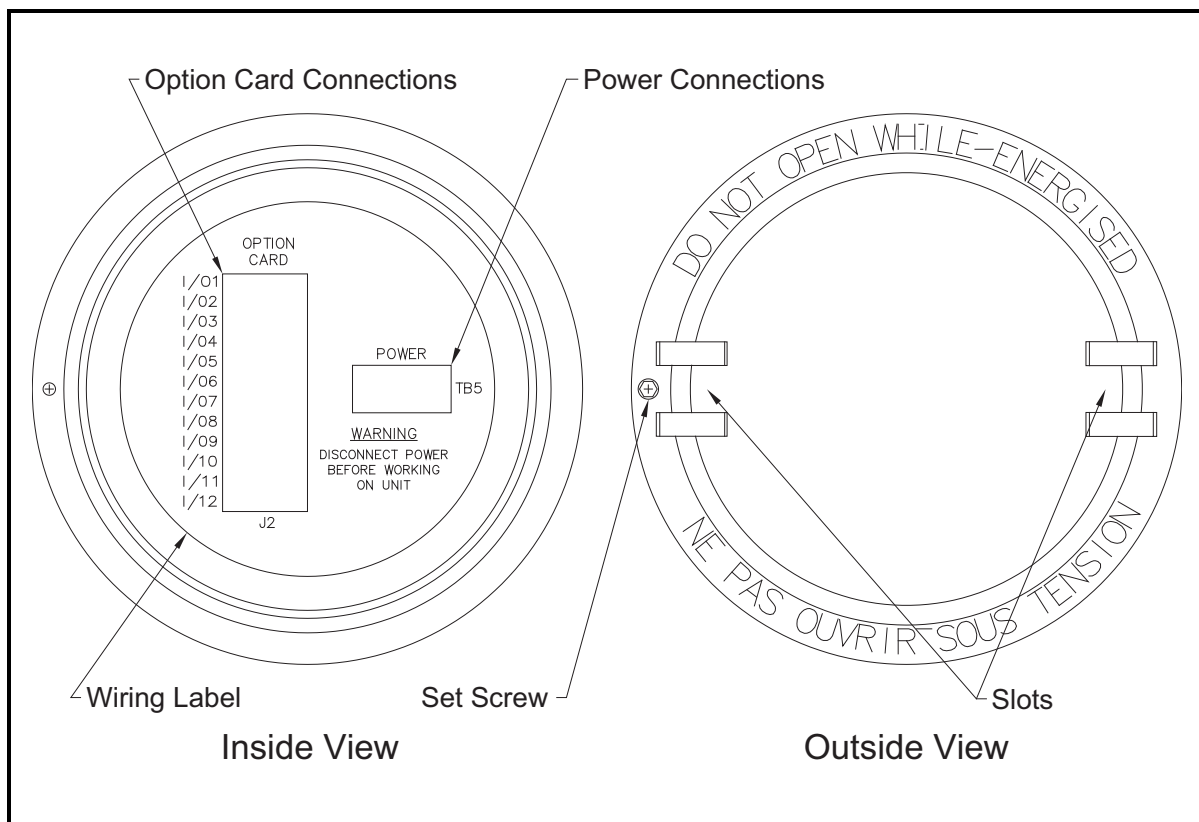


Figure 4: Rear Cover with Connection Labels

### 1.6.1 Wiring the Line Power

The Model PanaFlow Z1G may be ordered for operation with power inputs of 100-120 VAC, 220-240 VAC, or 12-28 VDC. The label on the side of the electronics enclosure lists the meter's required line voltage and power rating. The fuse size is listed in Chapter 4, *Specifications*. Be sure to connect the meter only to the specified line voltage.

**Note:** *For compliance with the European Union's Low Voltage Directive (2006/95/EC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the Model PanaFlow Z1G.*

Refer to Figure 9 on page 22 to locate terminal block TB5 and connect the line power as follows:

**WARNING!** Improper connection of the line power leads or connecting the meter to the incorrect line voltage may damage the unit. It may also result in hazardous voltages at the flowcell and associated piping as well as within the electronics enclosure.

1. Prepare the line power leads by trimming the line and neutral AC power leads (or the positive and negative DC power leads) to a length 0.5 in. (1 cm) shorter than the ground lead. This ensures that the ground lead is the last to detach if the power cable is forcibly disconnected from the meter.
2. Install a suitable cable clamp in the conduit hole indicated in Figure 9 on page 22. If possible, avoid using the other conduit holes for this purpose, to minimize any interference in the circuitry from the AC power line.

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#### !ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A, *CE Mark Compliance*.

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3. Strip 1/4 in. of insulation from the end of each of the three power line leads.
4. Route the cable through the conduit hole and connect the line power leads to terminal block TB5, using the pin number assignments shown in Figure 9 on page 22.
5. Leaving a bit of slack, secure the power line with the cable clamp.

**WARNING!** Make sure both covers, with their o-ring seals, are installed and the set screws tightened before applying power in a hazardous environment.

**CAUTION!** The transducers must be properly wired before applying power to the meter.

Proceed to the next section to continue the initial wiring of the Model PanaFlow Z1G flow transmitter.

## 1.6.2 Wiring Std 0/4-20 mA Analog Outputs

The standard configuration of the Model PanaFlow Z1G flow transmitter includes two isolated 0/4-20 mA analog outputs (designated as outputs 1 and 2). Connections to these outputs may be made with standard twisted-pair wiring, but the current loop impedance for these circuits must not exceed 600 ohms.

To wire the analog outputs, complete the following steps:

1. Disconnect the main power and remove the rear cover.
2. Install the required cable clamp in the chosen conduit hole on the side of the electronics enclosure.
3. Refer to Figure 9 on page 22 for the location of terminal block J1 and wire the analog outputs as shown. Secure the cable clamp.

**Note:** *Analog outputs 1 and 2 in the wiring diagram correspond to analog outputs A and B in Slot 0 in the PanaFlow Z1G software.*

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### !ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A,  
*CE Mark Compliance.*

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4. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

**WARNING!** Make sure both covers, with their o-ring seals, are installed and the set screws tightened before applying power in a hazardous environment.

**Note:** *Prior to use, the analog outputs must be set up and calibrated. See Chapter 1, Calibration, of the Service Manual for detailed instructions.*

Proceed to the next section to continue the initial wiring of the unit.



### 1.6.3 Wiring the Serial Port

The Model PanaFlow Z1G flowmeter is equipped with an optional RS232 or a standard RS485 serial interface. An RS485 option is also available with MODBUS capability. When the MODBUS option is present, the PanaFlow Z1G may also have the standard RS232 serial interface.

The serial port is used to transmit stored data and displayed readings to a personal computer by connecting the meter's serial interface to the serial port of the PC. In addition, the Model PanaFlow Z1G can receive and execute remote commands, using the *Instrument Data Manager* or *PanaView* software via this link.

For more information on serial communications refer to your *EIA-RS Serial Communications* manual (916-054). Proceed to the appropriate sub-section for wiring instructions.

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#### !ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A,  
*CE Mark Compliance*.

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#### 1.6.3a Wiring the RS232 Interface

Use the serial port to connect the Model PanaFlow Z1G flow transmitter to a printer, an ANSI terminal or a personal computer. The RS232 interface is wired as Data Terminal Equipment (DTE). Table 1 lists the standard cables available from the factory for this purpose.

**Table 1: GE Serial Cables**

Part Number	PC Connector	PanaFlow Z1G Connector
704-659	DB-25 Male	Flying Leads (5)
704-660	DB-9 Male	Flying Leads (5)
704-661	DB-25 Female	Flying Leads (5)
704-662	DB-9 Female	Flying Leads (5)

Each of the cables listed in the table above is available in several standard lengths. However, a user-supplied cable may be used, if preferred. In either case, wire the PanaFlow Z1G end of the serial cable in accordance with the pin designations listed in Table 2 on page 10.

### 1.6.3a Wiring the RS232 Interface (cont.)

Refer to Figure 9 on page 22 to complete the following steps:

**WARNING!** Dangerous voltages exist within the electronics enclosure. Do not attempt to wire the unit until the main power has been disconnected

1. Disconnect the main power and remove the rear cover.

**WARNING!** The PanaFlow Z1G must be moved to a safe environment before removing either cover.

2. Install the required cable clamp in the chosen conduit hole on the side of the electronics enclosure.
3. Use the information in Table 2 to construct a suitable cable for connecting the Model PanaFlow Z1G to the external device. If desired, an appropriate cable may be purchased from the factory.

**Table 2: RS232 Connection to DCE or DTE Device**

J1 Pin #	Signal Description	DCE DB25 Pin #	DCE DB9 Pin #	DTE DB25 Pin #	DTE DB9 Pin #
5	DTR (Data Terminal Ready)	20	4	20	4
6	CTS (Clear to Send)	4	7	5	8
7	COM (Ground)	7	5	7	5
8	RX (Receive)	2	3	3	2
9	TX (Transmit)	3	2	2	3

4. Feed the cable's flying leads through the conduit hole and wire it to terminal block J1. Connect the other end of the cable to the external serial device and secure the cable clamp.

After the wiring has been completed, consult the *User's Manual* for the external device to configure it for use with the PanaFlow Z1G.

### 1.6.3b Wiring the RS485 Interface

Use the optional RS485 serial port to network multiple PanaFlow Z1G flow transmitters to a single control system. As an option, the standard RS232 port on the PanaFlow Z1G may be configured as a two-wire, half-duplex RS485 interface.

**IMPORTANT:** *The Model PanaFlow Z1G must be configured at the factory for RS485 operation.*

To wire the RS485 serial port, refer to Figure 9 on page 22 and complete the following steps:

**WARNING!** Dangerous voltages exist within the electronics enclosure. Do not attempt to wire the unit until the main power has been disconnected

1. Disconnect the main power and remove the rear cover.

**WARNING!** The PanaFlow Z1G must be moved to a safe environment before removing either cover.

2. Install the required cable clamp in the chosen conduit hole on the side of the electronics enclosure.
3. Feed one end of the cable through the conduit hole, wire it to terminal block J1 and secure the cable clamp. Use the information in Table 3 to wire a suitable cable for connecting the PanaFlow Z1G to the external device.

**Table 3: RS485 Connections**

J1 Pin #	Signal Description
9	Data +
8	Data -
7	Shield
6	Not Used
5	Not Used
4	Not Used

4. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

Proceed to the next section to continue the initial wiring of the unit.

### 1.6.4 Wiring the Option Cards

The Model PanaFlow Z1G can accommodate one option card in Slot 1 and one option card in Slot 2. The following option card functions are available only in certain combinations.

- Analog Inputs (Slot 1)
- RTD Inputs (Slot 1)
- Analog Outputs (Slot 1)
- MODBUS Communications (Slot 2)
- MODBUS/TCP Communications (Slot 2)
- Ethernet (Slot 2)
- Foundation Fieldbus (Slot 2)
- Data Logging (Slot 2) - *no wiring required*

Pin 1	OUT A - +24V
2	INPUT A - +
3	INPUT A - RTN
4	OUT B - +24V
5	INPUT B - +
6	INPUT B - RTN
7	RTD - C
8	COMM - C
9	COM - C
10	RTD - D
11	COMM - D
12	COM - D

**Figure 5: PanaFlow Z1G Option Card  
Connection Labels (ref. dwg. 442-615)**

Figure 3 above shows the connection labels for the option cards. Wiring any option card installed in Slot 1 requires completion of the general steps listed on the next page.

### 1.6.4a Preparing for Wiring

1. Disconnect the main power and remove the rear cover.
2. Install a cable clamp in the chosen conduit hole on the side of the electronics enclosure and feed a standard twisted-pair cable through this conduit hole.
3. Locate the 12-pin terminal block (J2) in Figure 9 on page 22 and wire the option card as indicated on the label inside the rear cover (see Figure 4 on page 6 and Figure 5 on page 12). Secure the cable clamp.

**IMPORTANT:** *Because of the attached wiring label, all rear covers must remain with their original meters.*

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#### !ATTENTION EUROPEAN CUSTOMERS!

To meet CE Mark requirements, all cables must be installed as described in Appendix A,  
*CE Mark Compliance.*

---

4. If wiring of the unit has been completed, reinstall the rear cover on the enclosure and tighten the set screw.

**Note:** *Prior to use, the option card must be set up and calibrated. See Chapter 1, Programming Site Data, in the Programming Manual and Chapter 1, Calibration, in the Service Manual for detailed instructions.*

For more specific instructions on particular option cards, proceed to the appropriate section(s) that follow.

### 1.6.4b Wiring a 0/4-20 mA Analog Inputs Option Card

To calculate the standard flow rates, the Model PanaFlow Z1G requires accurate *temperature* and *pressure* data from the measurement site. Transmitters installed in the flowcell can provide this information via an optional 0/4-20 mA analog inputs option card. This option card includes two or four isolated 0/4-20 mA analog inputs (designated as A, B, C and D), each of which includes a 24 VDC power supply for loop-powered transmitters. Either input may be used to process the temperature signal, while the other input is used to process the pressure signal.

**Note:** *To properly enter programming data into the meter, it is necessary to know which input is assigned to which process parameter. This information should be entered in Appendix B, Data Records.*

The analog inputs, which have an impedance of 118 ohms, should be connected with standard twisted-pair wiring. Power to the transmitters may be supplied either by the integral 24 VDC power supply on the analog input option card or by an external power supply. Figure 6 shows typical wiring diagrams, with and without an external power supply, for one of the analog inputs.

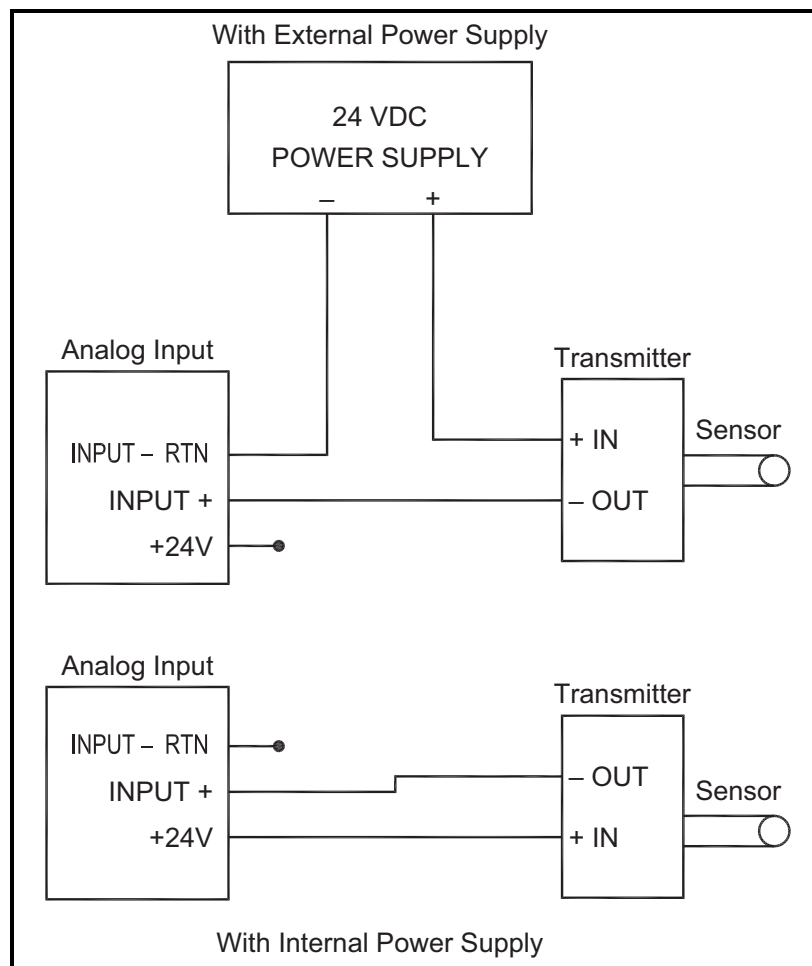


Figure 6: Analog Input Wiring Diagram

#### 1.6.4b Wiring a 0/4-20 mA Analog Inputs Option Card (cont.)

Before making any connections, complete the steps in *Preparing for Wiring* on page 13. Wire the analog inputs as shown on the label in the rear cover (see Figure 5 on page 12).

**Note:** *The analog inputs option card can be calibrated with the Model PanaFlow Z1G's built-in analog outputs. However, be certain that the analog outputs have been calibrated first. See Chapter 1, Calibration, in the Service Manual for the appropriate procedures.*

#### 1.6.4c Wiring an RTD Inputs Option Card

The Model PanaFlow Z1G RTD (Resistance Temperature Device) inputs option card provides two or four direct RTD inputs (designated as A, B, C and D). Each RTD input requires three wires, and should be connected as shown on the label in the rear cover (see Figure 4 on page 6 and Figure 5 on page 12).

**Note:** *Before making any connections, complete the steps in Preparing for Wiring on page 13.*

#### 1.6.4d Wiring a 0/4-20 mA Analog Outputs Option Card

The analog outputs option card includes two isolated 0/4-20 mA outputs (designated as A and B). Connections to these outputs may be made with standard twisted-pair wiring, but the total current loop impedance for these circuits must not exceed 1,000 ohms.

Before making any connections, complete the steps in *Preparing for Wiring* on page 13. Then, wire this option card with the connections shown on the label in the rear cover (see Figure 4 on page 6 and Figure 5 on page 12).

### 1.6.4e A Specific Example

To illustrate the procedures described in the previous sections for wiring the option cards, a specific example may prove helpful. Assume that a Model PanaFlow Z1G is equipped with an option card numbered *703-1223-08*. This option card includes two analog current inputs and two standard alarm relays.

By referring to Figure 5 on page 12, it is determined that the appropriate connection diagram for this option card is the second one from the left in the middle row (AI,HI). This label should also be found inside the rear cover of the PanaFlow Z1G. Based on this information, wiring of the Input/Output connections to terminal block J2 should be completed as shown in Table 4.

**Table 4: Wiring a 703-1223-08 Option Card**

J2 Pin #	Description	Connection
1	Alarm A	Normally Open
2	Alarm A	Common
3	Alarm A	Normally Closed
4	Alarm B	Normally Open
5	Alarm B	Common
6	Alarm B	Normally Closed
7	Out C	+24 V to Input C
8	Input C	Signal (+)
9	Input C	Return (-)
10	Out D	+24 V to Input D
11	Input D	Signal (+)
12	Input D	Return (-)



### 1.6.4f Wiring the MODBUS Option Card

The MODBUS option card uses the RS485 standard for MODBUS communication. The MODBUS card must be installed in Slot 2. The RS485 standard allows up to 32 nodes (drivers and receivers) on one multidrop network, at distances up to 4,000 ft (1,200 m). GE recommends using 24-gauge (24 AWG) twisted-pair wire with a characteristic impedance of 120 ohms and 120-ohm termination at each end of the communications line.

**Note:** *The MODBUS option card provides its own RS485 connections. Thus, the meter can have its serial port configured as RS232 and still provide RS485 MODBUS signals.*

**IMPORTANT:** *Because the MODBUS option card uses pins 1 and 2 on terminal block J2, only those option cards that do not use these pins may be installed in Slot 1, while a MODBUS card is installed in Slot 2. Specifically, only the option cards designated as “OI” and “OR” in Figure 5 on page 12 are compatible with the MODBUS option card.*

To link the PanaFlow Z1G to the control system (refer to Figure 7):

1. Connect the MODBUS – wire to pin #2, the inverting or negative connection.
2. Connect the MODBUS + wire to pin #1, the non-inverting or positive connection.
3. Pin #3 has no connection.

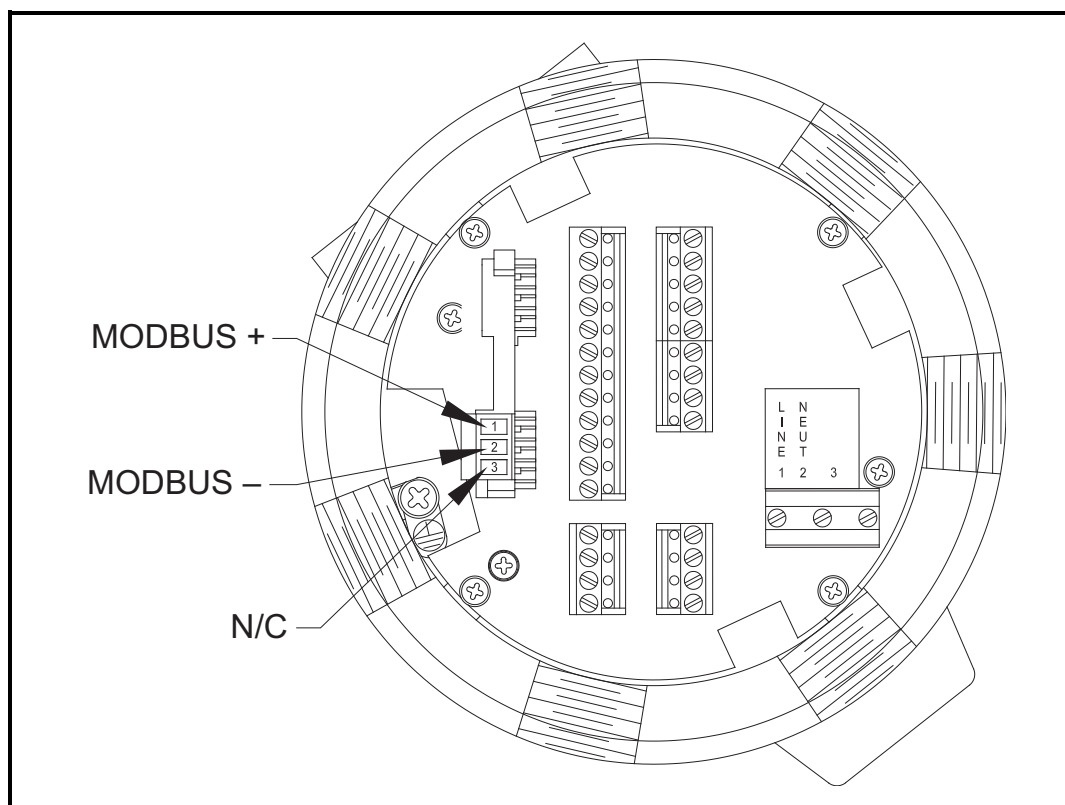


Figure 7: The RS485 MODBUS Terminal Block Connector

### 1.6.4g Wiring the MODBUS/TCP Interface

Customers can also use a modified PanaFlow Z1G that provides a MODBUS/TCP interface to communicate to an internal network. An optional MODBUS/TCP card with a unique MAC (IP) address (installed only in slot 2) includes an RJ45 connector. To connect the MODBUS/TCP-enabled PanaFlow Z1G to the network, insert the jack of an RJ45 cable into the RJ45 connector, route the cable through one of the conduit holes using an appropriate cable clamp, and wire the other end of the cable to the Ethernet network according to the manufacturer's instructions. See Figure 10 on page 23.

**Note:** *The MAC address for a specific PanaFlow Z1G is included with customer documentation. For more information on setting up the MAC address, refer to Chapter 6 of the Programming Manual.*

### 1.6.4h Wiring the Ethernet Interface

A modified PanaFlow Z1G can use the Ethernet interface to communicate to a local area network. An optional Ethernet card with a unique MAC (IP) address (installed only in slot 2) includes an RJ45 connector. To connect the Ethernet-enabled PanaFlow Z1G to the network, insert the jack of an RJ45 cable into the RJ45 connector, route the cable through one of the conduit holes using an appropriate cable clamp, and wire the other end of the cable to the Ethernet network according to the manufacturer's instructions. An external connection is required between the Ethernet option card and the PanaFlow Z1G's RS232 connector, as shown in Table 5 and Figure 10 on page 23.

**Note:** *The MAC address for a specific PanaFlow Z1G is included with customer documentation. For more information on setting up the MAC address, refer to Appendix C of the Programming Manual.*

**Table 5: RS232 to Ethernet Interconnections**

PanaFlow Z1G Type	Terminal Block	Terminal Block
Terminal	RS232 on Rear Board	TB1 on Ethernet Card
	TX	Pin 1
	RX	Pin 2
	COM	Pin 3

### 1.6.4i Wiring the Foundation Fieldbus Interface

To connect the Foundation Fieldbus interface to the PanaFlow Z1G, make the network connections at J8, pins 1 and 2, as shown in drawing Y of Figure 10 on page 23. As an option, you can connect a shield to J8 pin 3, depending on the network wiring.

No connections are made to J9 under normal operation. If you need to reset the network board to factory defaults:

1. Connect a jumper between J9 pin 2 and J9 pin 3.
2. Power cycle (i.e., turn off and on) the PanaFlow Z1G.
3. Ten seconds after the power has been restored to the PanaFlow Z1G, remove the jumper to return the network board to normal operation.

### 1.6.4j Data Logging Option Card

The Model PanaFlow Z1G can be fitted with a data logging option card, which must be installed in Slot 2. The data logging option card increases the PanaFlow Z1G's memory by up to 2 MB.

**Note:** *The data logging menu option is not available unless this card is installed.*

After the Model PanaFlow Z1G has been completely installed and wired, proceed to Chapter 2, *Initial Setup*, to program the meter for taking flow rate measurements.



**WARNING!** Make sure both covers, with their o-ring seals, are installed and the set screws tightened before applying power in a hazardous environment.



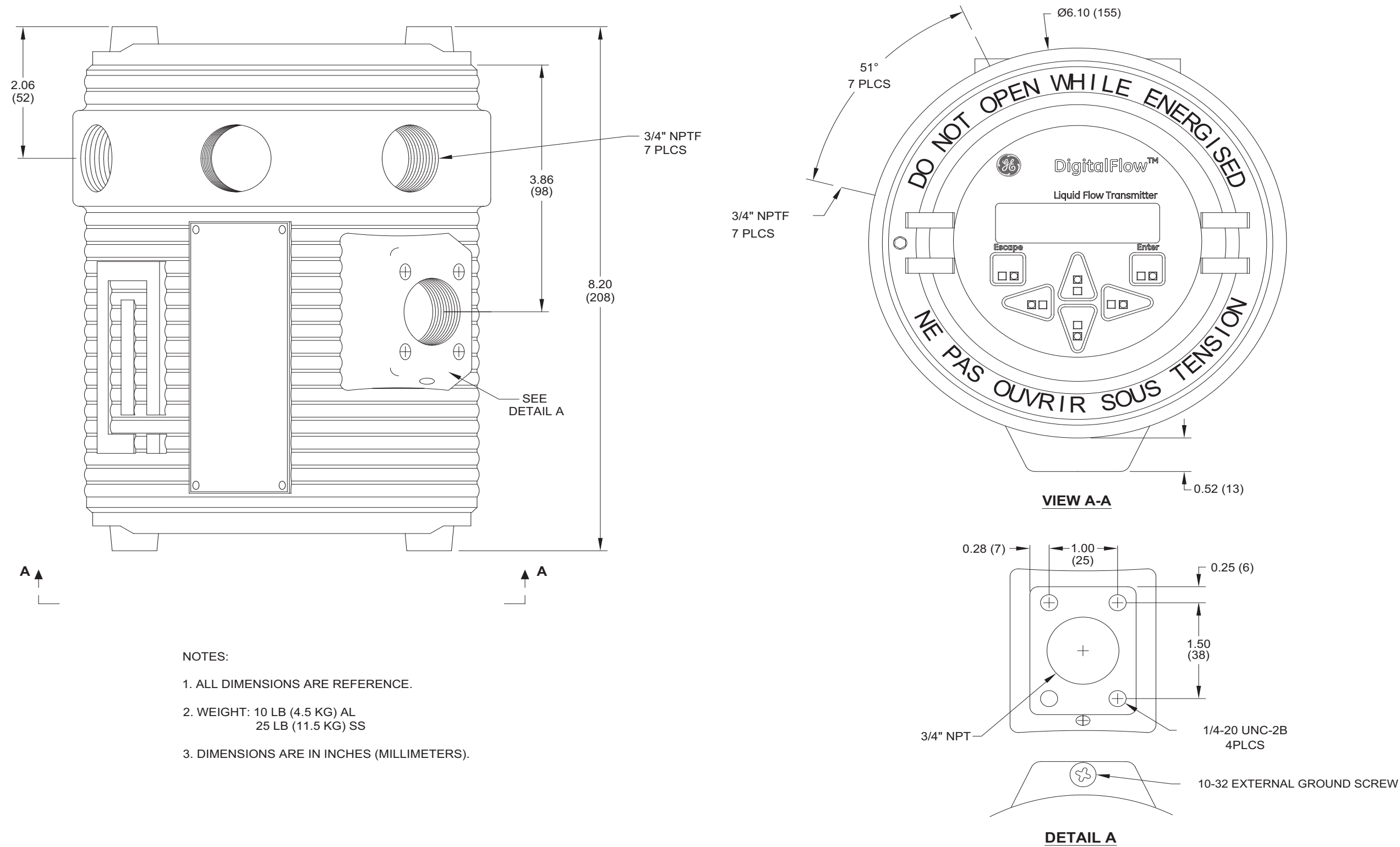


Figure 8: PanaFlow Z1G Outline and Installation (ref. dwg. 712-131)

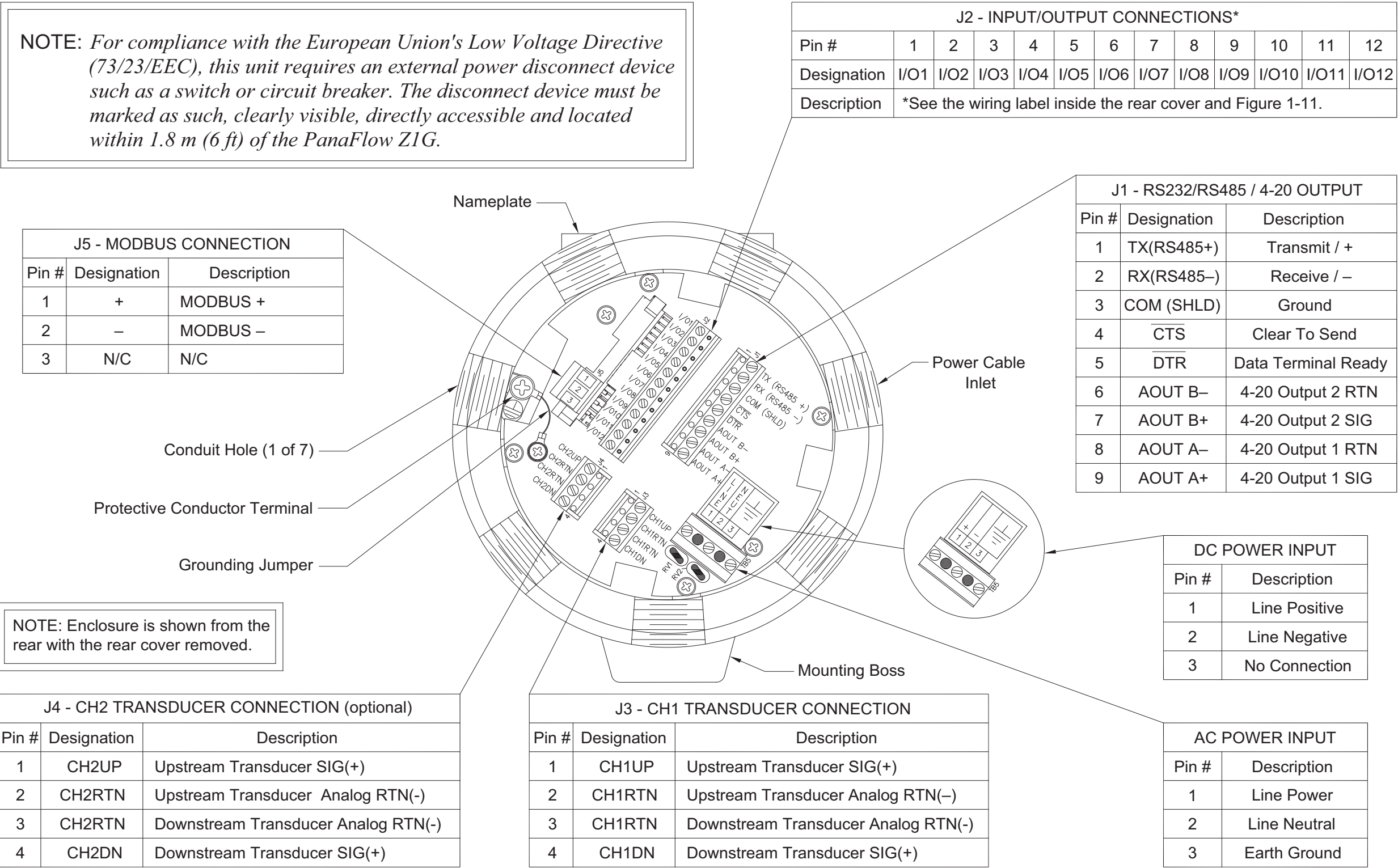


Figure 9: PanaFlow Z1G Wiring Diagram

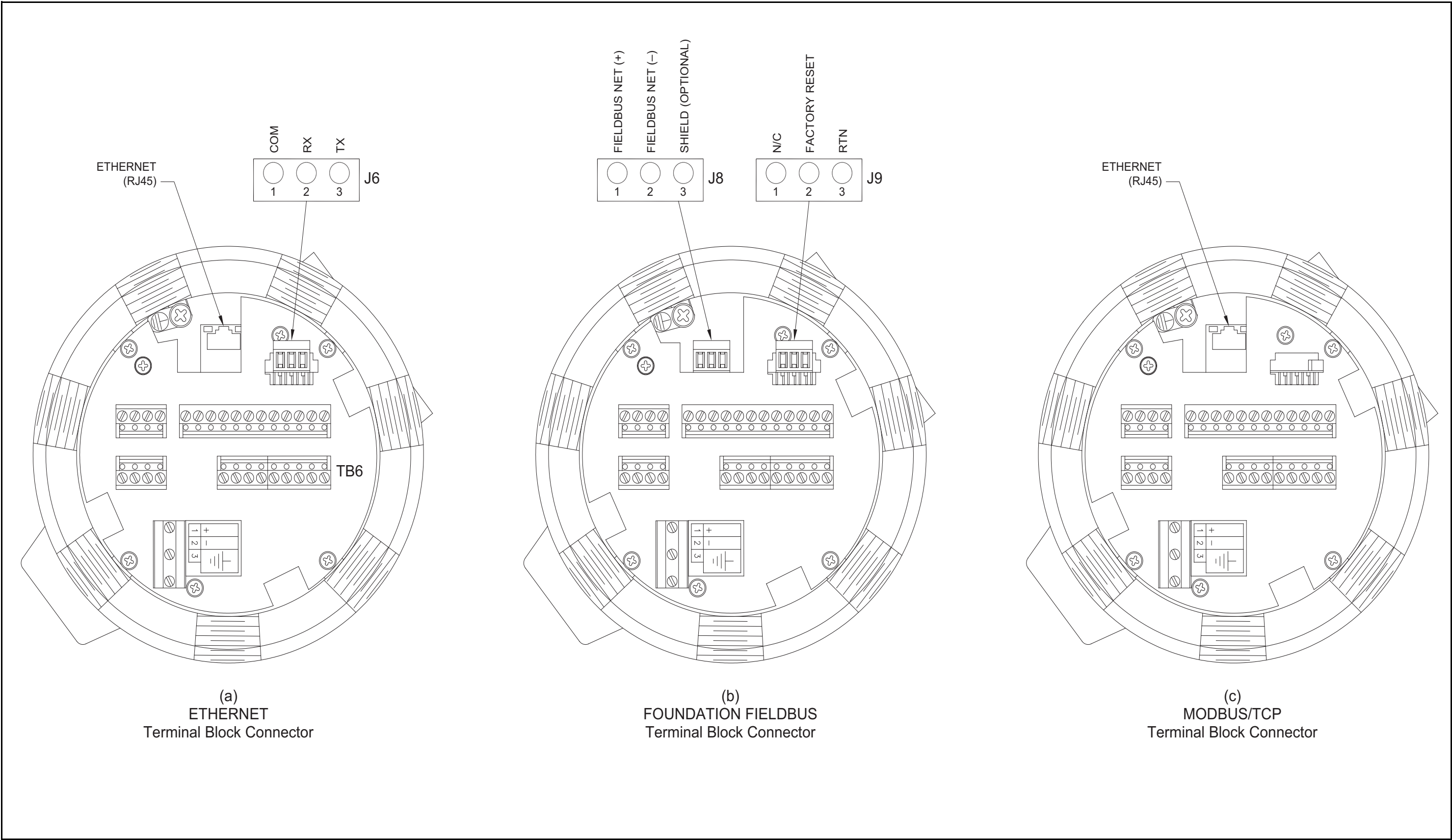


Figure 10: PanaFlow Z1G Ethernet, Foundation Fieldbus and MODBUS/TCP Terminal Block Connections





## Chapter 2. Initial Setup

### 2.1 Introduction

This chapter provides instructions for programming the minimum amount of data required to place the PanaFlow Z1G flowmeter into operation. Before the Z1G can begin taking measurements and displaying valid data, the current system and pipe parameters must be entered. In addition, a 2-Channel meter requires that each channel be activated prior to use. Additional programming options provide access to the more advanced features of the Model PanaFlow Z1G, but this information is not required to begin taking measurements.

Refer to the *Programming Manual* for information on programming all other features. Be sure to record all programming data in Appendix B, *Data Records*.

As a guide in following the programming instructions in this chapter, the relevant portions of the Model PanaFlow Z1G menu map have been reproduced in Figure 12 on page 35.

### 2.2 Programming Methods

**Note:** See the *Programming Manual* for information on those User Program features not covered in this chapter.

You can program the PanaFlow Z1G via either the magnetic keypad on the lower part of the glass enclosure, or **PanaView™**, a PC-based, non-resident software program that communicates with the PanaFlow Z1G via its RS232 serial port. PanaView supplements basic PanaFlow Z1G functions with several additional capabilities. With PanaView, you can:

- load and save site file data
- create and save graph and log files
- display text output and graphs of live measurement data
- create custom templates for displaying text, graph and log data
- interface with multiple GE instruments.

This chapter focuses on programming via the magnetic keypad. For information on programming the PanaFlow Z1G via PanaView, refer to Appendix C of the *Programming Manual*.

## 2.3 The Z1G Enclosure Magnetic Keypad

The window at the top of the PanaFlow Z1G enclosure includes the components shown in Figure 11 below.

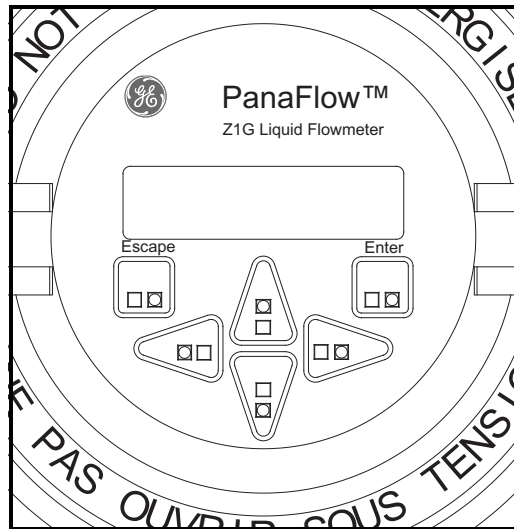


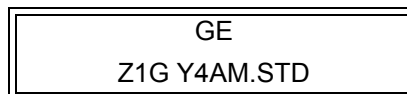
Figure 11 Enclosure Window

**IMPORTANT:** *The Z1G's magnetic keypad enables programming of the instrument through the glass faceplate without removing the cover. Thus, all programming procedures may be performed while the unit is installed in a hazardous area.*

Six keys on the magnetic keypad enable users to program the PanaFlow Z1G:

- [Enter] - confirms choice of a specific option and data entry within the option
- [Escape] - allows users to exit from a specific option without entering unconfirmed data
- [△] and [▽] - enable users to view a specific measurement in the Key display setting or to scroll through a list of options (letters and numbers 0-9 as well as the negative sign and decimal point) in a menu
- [◀] and [▶] - enable users to scroll to a specific option, among choices in an option, or to a character in a text entry.

When you power up the PanaFlow Z1G, the display first shows the model and software version:



## 2.3 The Z1G Enclosure Magnetic Keypad (cont.)

The meter then starts to display measured parameters.

CH1	VEL	E1
10.00		Ft/s

To enter the *Keypad Program*, press the [Escape] key, followed by the [Enter] key, and the [Escape] key again. Each successive key must be entered within 10 seconds of the prior key.

As a guide in following the programming instructions in this chapter, the relevant portions of the Model PanaFlow Z1G menu map have been reproduced in Figure 12 on page 35. Proceed to the following sections to enter data in the Channel or GLOBL menus.

**IMPORTANT:** *If the keypad has not been pressed for 10 minutes, the PanaFlow Z1G exits the Keypad Program and returns to displaying measurements. The meter retains any configuration changes that were confirmed with the [Enter] key, and restarts as if the operator had completed the programming cycle.*

## 2.4 Entering Data in the Global Menu

To begin programming your meter, you must select the system units from the GLOBL menu as discussed below. Refer to Figure 12 on page 35 and remember to record all programming data in Appendix B, *Data Records*.

**Note:** Refer to the Programming Manual for information on the other submenus in the GLOBL menu.

### 2.4.1 Entering Global System Data

The GLOBL-SYSTM submenu is used to enter several general system parameters (e.g., English or metric units). For units with 2 channels, this menu is also used to compute parameters such as the sum, difference or average of the channel 1 and channel 2 signals. When calculating the SUM, DIF or AVE readouts, data from the GLOBL-SYSTM submenu is used. Any conflicting data entered in the CHANNEL-SYSTM submenu is overridden.

1. In the *Keypad Program*, scroll to PROG and press [Enter].
2. In the PROG menu, scroll to GLOBL and press [Enter].
3. In the Global PROGRAM menu, scroll to SYSTM and press [Enter].
4. Scroll to the desired *System Units* selection (either metric or English) and press [Enter]. The PanaFlow Z1G will display all parameters and measurements in the designated units.
5. Scroll to the desired *Pressure Units* selection (absolute or gauge) and press [Enter].
6. Do one of the following:
  - If PSIIa (absolute) was selected, proceed to Step 7.
  - If PSIIg (gauge) was selected, enter the desired atmospheric pressure, press [Enter] and proceed to Step 7.
7. Do one of the following:
  - For a single-channel PanaFlow Z1G, the program returns to the Global PROGRAM menu.

### 2.4.1a Selecting Volumetric Units

1. Scroll to the desired *Volumetric Units* for the flow rate display and press [Enter]. Table 6 lists the available volumetric units.

**Table 6: Available Volumetric/Totalizer Units**

English	Metric
ACF = Actual Cubic Feet	ACM = Actual Cubic Meters
KACF = Thousands of ACF	KACM = Thousands of ACM
MMACF = Millions of ACF	MMACM = Millions of ACM
SCF = Standard Cubic Feet	SCM = Standard Cubic Meters
KSCF = Thousands of SCF	KSCM = Thousands of SCM
MMSCF = Millions of SCF	MMSCM = Millions of SCM

2. Scroll to the desired unit of *Volumetric Time* (from seconds to days), and press [Enter].
3. Scroll to the desired number of *Vol Decimal Digits* (digits to the right of the decimal point) in the volumetric flow display, and press [Enter].

### 2.4.1b Selecting Totalizer Units

4. Scroll to the desired *Totalizer Units* for the flow rate display and press [Enter]. Available units are listed in Table 6.
5. Scroll to the desired number of *Tot Decimal Digits* (digits to the right of the decimal point in the totalized flow rate display) and press [Enter].
6. Do one of the following:
  - If MASS FLOW is ON, proceed to *Selecting Mass Flow Units* on page 30.
  - If MASS FLOW is OFF, the meter returns to the Global PROGRAM window. Press [Escape] twice and proceed to Chapter 3, *Operation*, or the *Programming Manual*.

**Note:** To activate mass flow, see *Activating Mass Flow in Chapter 1* of the Programming Manual. The following prompts appear only if mass flow is activated for both channels.

### 2.4.1c Selecting Mass Flow Units

1. Scroll to the desired *Mass Flow* units for the flow rate display and press [Enter]. The available units for this prompt are determined by the selection made at the *System Units* screen. See Table 7.

**Table 7: Available Mass Flow Units**

English	Metric
LB = Pounds	Kilograms
KLB = Thousands of LB	Metric Tons (1000 KG)
MMLB = Millions of LB	
Tons (2000 LB)	

2. Scroll to the desired *Mass Flow Time* units for the mass flow rate display (from seconds to days) and press [Enter].
3. Scroll to the desired number of *Mdot Dec. Digits* (digits to the right of the decimal point in the mass flow rate display) and press [Enter].
4. Scroll to the desired *Mass (Totalizer)* units for the totalized mass flow rate display and press [Enter]. The available units for this prompt are determined by the selection made at the *System Units* prompt.
5. Scroll to the desired number of *Mass Dec. Digits* (digits to the right of the decimal point in the totalized mass flow rate display) and press [Enter].
6. After completing the above steps, the PanaFlow Z1G returns to the Global PROGRAM window. Press [Escape] and scroll to CH1 or CH2 to continue setup programming.

## 2.5 Activating a Channel

The Channelx-ACTIV submenu permits selection of the desired measurement method. In addition, it is used to activate/deactivate one or both of the channels in a 2-Channel Model PanaFlow Z1G.

To access the Channelx-ACTIV submenu:

1. From the *Keypad Program*, scroll to CH1 or CH2 and press [Enter].
2. In the Channel PROGRAM menu, scroll to ACTIV and press [Enter].
3. Scroll to *Burst* to activate the channel/path, and press [Enter].

**Note:** *Burst is automatically selected for a 1-Channel meter.*

4. Scroll to one of the measurement methods described below and press [Enter].
  - *Skat Only* is the preferred technique for locating the acoustic signal and for high velocity measurements. It is more robust in a noisy environment than the Measure technique.
  - *Skat/Measure* is the preferred technique to use for low velocity measurements.

If *Skat Only* is selected at the above prompt, the meter uses this technique exclusively. However, if *Skat/Measure* is selected, the meter uses *Skat Only* to find the acoustic signal and then tries to use the *Skat/Measure* technique for the actual measurement.

After completing the above step, the meter returns to the Channel PROGRAM window. Proceed to the next section to continue programming your meter.

## 2.6 Entering System Data for the Channel

The Channelx-System submenu is used to enter system parameters for the channel.

### 2.6.0a Accessing the Channelx-System Submenu

1. From the Channel PROGRAM menu, scroll to SYSTM and press [Enter].
2. The first prompt asks for the *Channel Label*. Use the four scrolling keys to enter the desired label (in any numeric or text combination up to five characters), and press [Enter].
3. The next prompt asks for the *Channel (Site) Message*. Enter the desired text in the same manner as the channel label with up to 15 characters, and press [Enter].

### 2.6.0b Selecting Volumetric Units

1. Scroll to the desired *Volumetric Units* for the flow rate display and press [Enter]. Available units are listed in Table 8 below.
2. Scroll to the desired *Volumetric Time* units for the flow rate display (from seconds to days) and press [Enter].
3. Scroll to the desired number of *Vol Decimal Digits* (digits to the right of the decimal point in the volumetric flow rate display) and press [Enter].

**Table 8: Available Volumetric/Totalizer Units**

English	Metric
ACF = Actual Cubic Feet	ACM = Actual Cubic Meters
KACF = Thousands of ACF	KACM = Thousands of ACM
MMACF = Millions of ACF	MMACM = Millions of ACM
SCF = Standard Cubic Feet	SCM = Standard Cubic Meters
KSCF = Thousands of SCF	KSCM = Thousands of SCM
MMSCF = Millions of SCF	MMSCM = Millions of SCM

### 2.6.0c Selecting Totalizer Units

1. Scroll to the desired *Totalizer Units* for the totalized flow rate display and press [Enter]. Available units are listed in Table 8.
2. Scroll to the desired number of *Tot Decimal Digits* (digits to the right of the decimal point in the totalized flow rate display) and press [Enter].
3. Do one of the following:
  - If MASS FLOW is ON, proceed to *Selecting Mass Flow Units* on page 33.
  - If MASS FLOW is OFF, the meter returns to the Channel PROGRAM window.

**Note:** To activate mass flow, see *Activating Mass Flow in Chapter 1* of the Programming Manual.



### 2.6.0d Selecting Mass Flow Units

1. Scroll to the desired *Mass Flow* units for the flow rate display and press [Enter]. The available units for this prompt are determined by the selection made at the *System Units* prompt. See Table 9 below.

**Table 9: Available Mass Flow Units**

English	Metric
LB = Pounds	Kilograms
KLB = Thousands of LB	Metric Tons (1000 KG)
MMLB = Millions of LB	
Tons (2000 LB)	

2. Scroll to the desired *Mass Flow Time* units for the mass flow rate display and press [Enter].
3. Scroll to the desired number of *Mdot Decimal Digits* (digits to the right of the decimal point in the mass flow rate display) and press [Enter].
4. Scroll to the desired *Mass (Totalizer)* units for the totalized mass flow rate display and press [Enter]. The available units for this prompt are determined by the selection made at the *System Units* prompt.
5. Scroll to the desired number of *Mass Dec. Digits* (digits to the right of the decimal point in the totalized mass flow rate display) and press [Enter].

After completing the above steps, the PanaFlow Z1G returns to the Channel PROGRAM window.

[no content intended for this page]

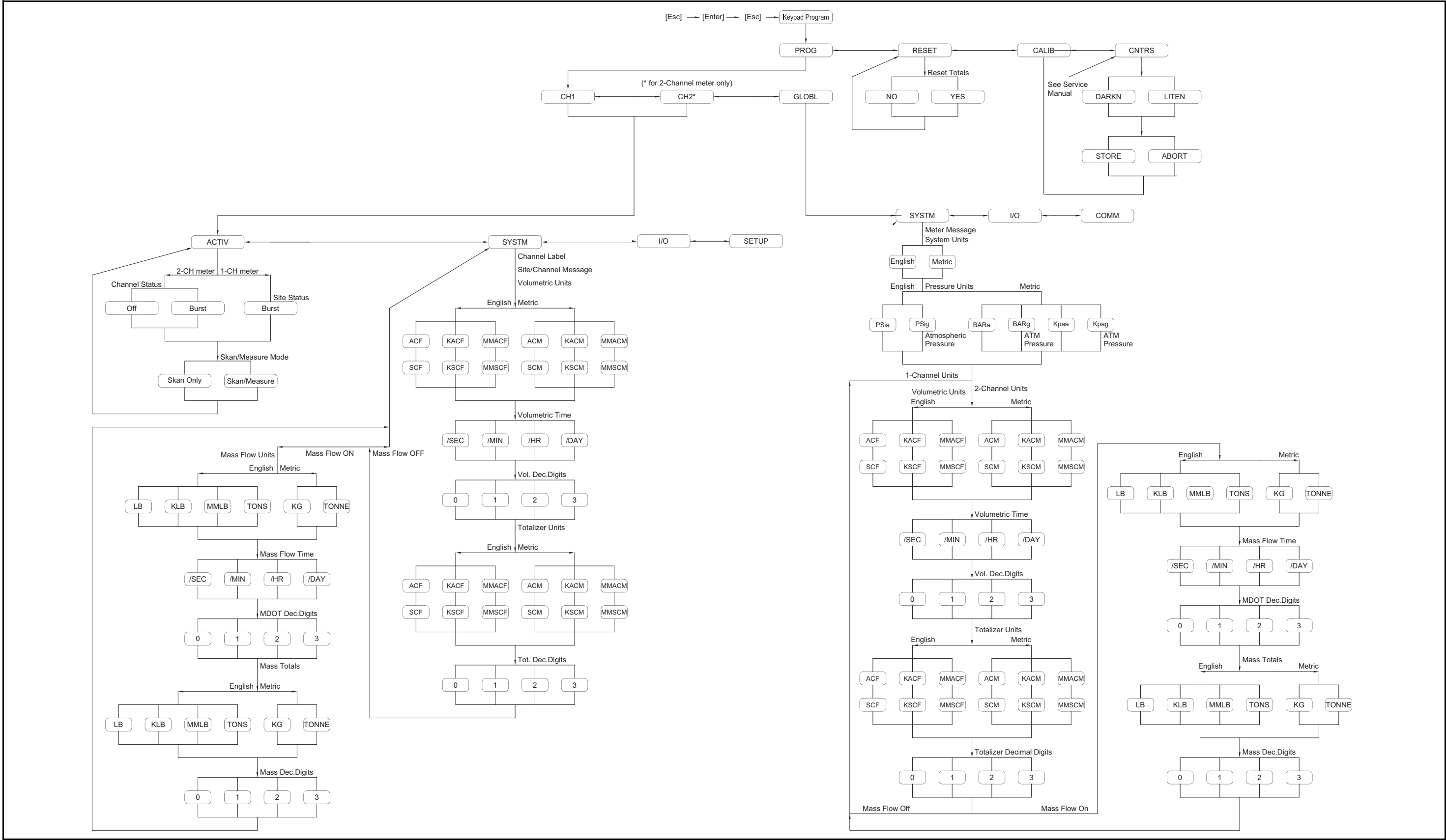


Figure 12: Model PanaFlow Z1G Initial Setup Menu Map

[no content intended for this page]

## Chapter 3. Operation

### 3.1 Introduction

See Chapter 1, *Installation*, and Chapter 2, *Initial Setup*, to prepare the Model PanaFlow Z1G system for operation. When the meter is ready to take measurements, proceed with this chapter. The following specific topics are discussed:

- Powering Up
- Using the Display
- Taking Measurements
- Recording Diagnostics

**Note:** *All inputs and outputs of the Model PanaFlow Z1G are calibrated at the factory, prior to shipment. If it becomes necessary to recalibrate any of the inputs and/or outputs, see Chapter 1, Calibration, of the Service Manual for instructions.*



**WARNING!** To ensure the safe operation of the Model PanaFlow Z1G, it must be installed and operated as described in this manual. In addition, be sure to follow all applicable local safety codes and regulations for the installation of electrical equipment.

## 3.2 Powering Up

Because the Model PanaFlow Z1G does **not** have an ON/OFF switch, it will power up as soon as the connected power source is energized.

**Note:** *For compliance with the European Union's Low Voltage Directive (2006/95/EC), this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the Model PanaFlow Z1G.*

There are three methods for obtaining readings from the PanaFlow Z1G:

- Built-in LCD display
- PanaView software on a computer
- Device to read the PanaFlow Z1G's analog output

At least one of the above display options must be installed in order to obtain flow rate readings from the meter.

Immediately upon power up the software version display appears. Then, the meter performs a series of internal checks, which take about 45 seconds, prior to displaying the flow rate data.

**Note:** *If the Model PanaFlow Z1G fails any of the internal checks (see Chapter 2, Error Codes, in the Service Manual), try disconnecting the power and then repowering the unit. If the meter continues to fail any of the internal checks, contact the factory for assistance.*

After successfully performing the internal checks, the Model PanaFlow Z1G begins taking measurements and the software version display is replaced by a measurement mode display. Proceed to the appropriate section for instructions on using the LCD display and the PanaView display option.

**Note:** *As a minimum, the system and pipe parameters (for each installed channel of a 2-channel meter) must be entered before the Model PanaFlow Z1G can display valid data. Refer to Chapter 2, Initial Setup, for specific instructions.*

### 3.3 The LCD Display

The components of the LCD display are shown in Figure 13, along with a typical mass flow rate readout.

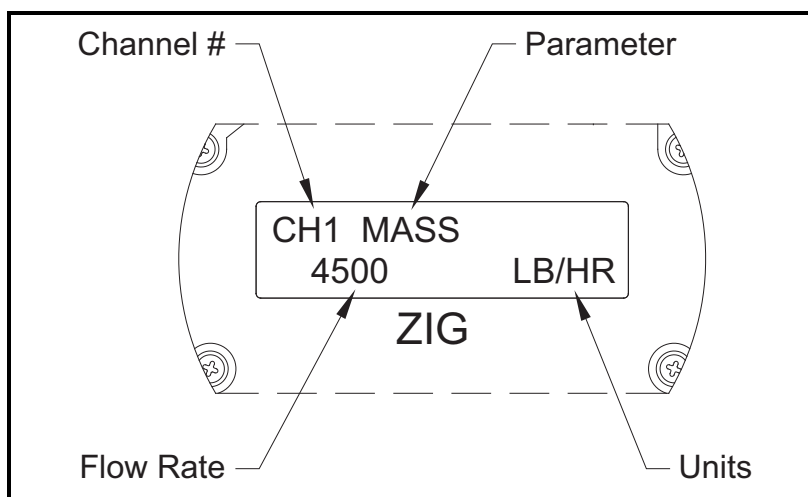


Figure 13 A Typical LCD Flow Rate Display

As shown in Figure 13, the display screen includes the following information:

- Channel Number
- Flow Parameter
- Units of Measure
- Flow Rate Value

The example in Figure 13 uses the default display settings. However, the first three items in the list above may be reprogrammed to display a variety of alternative choices. See the *Programming Manual* for detailed instructions on programming these parameters.

**Note:** *The LCD backlight flashes to signal errors. If the backlight is off when an error is detected, the display is illuminated briefly; if the backlight is already on, the light is interrupted briefly. Error code messages may appear in the upper right corner of the LCD display. For information about these error codes and how to respond to them, refer to Chapter 2, Error Codes, in the Service Manual.*

Proceed to the *Taking Measurements* section to use the PanaFlow Z1G.

### 3.4 The Optional PanaView Display

The components of the PanaView text display appear in Figure 14, along with a typical flow rate readout.

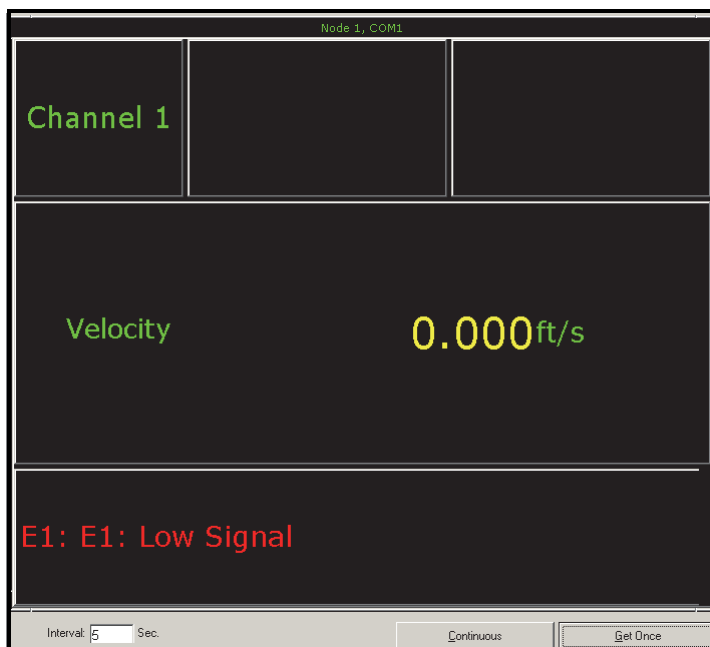


Figure 14 A Typical PanaView Text Display Pane

As shown in Figure 14, the text pane includes the following information:

- Channel Number
- Flow Parameter
- Units of Measure
- Flow Rate Value

The example in Figure 14 is typical, but the first three items in the list above may be reprogrammed to display a variety of alternative choices. See the next section for detailed instructions on programming these parameters.

**Note:** *Error code messages may appear in the lower left corner of the PanaView text display window. For information about these error codes and how to respond to them, refer to Chapter 2, Error Codes, in the Service Manual.*

Proceed to the *Taking Measurements* section to use the PanaFlow Z1G.



## 3.5 Taking Measurements

The Model PanaFlow Z1G is capable of displaying several different variables in a variety of formats. However, this manual will discuss only the basic measurement displays using the LCD display or the PanaView display. Refer to Chapter 2, *Displaying Data*, in the *Programming Manual* for instructions on setting up alternate choices. Also, refer to the *Programming Manual* and/or the *PanaView User's Manual* to use PanaView or the analog outputs to obtain the flow rate data.

### 3.5.1 Programming the LCD

**Note:** *When you first initialize the PanaFlow Z1G, the number of LCD parameters is set to OFF. You must program the LCD to display any measured parameters.*

Through the *Keypad Program*, you can program the LCD display to display up to four variables in sequence. Complete the following steps to program the LCD display:

1. Power up the PanaFlow Z1G and wait until it has initialized.
2. Press [Escape], [Enter], [Escape].
3. In the *Keypad Program* window, scroll to PROG and press [Enter].
4. In the PROG menu, scroll to GLOBL and press [Enter].
5. Scroll to I/O and press [Enter].
6. Scroll to LCD and press [Enter].
7. The window now asks for the *# of LCD Parameters*. Scroll to the desired number (from OFF through 1-4 and KEY) and press [Enter].

The OFF setting switches the measurement display off, while the KEY setting enables users to change the measurement display via the arrow keys, without accessing the *Keypad Program*. If you select KEY:

- To view a parameter other than the one currently displayed, press the [ $\Delta$ ] or [ $\nabla$ ] keys to scroll through the various parameters.

### 3.5.1 Programming the LCD (cont.)

8. Select the desired *Measurement Parameter*, as shown in Table 10.

**Table 10: Available Measurement Parameters**

Option Bar	Description	Good	Bad
VEL	Displays the flow velocity.	N.A.	N.A.
VOLUM	Displays the volumetric flow.	N.A.	N.A.
+TOTL	Displays the forward totalized volume flow.	N.A.	N.A.
-TOTL	Displays the reverse totalized volume flow.	N.A.	N.A.
TIMER	Displays the total flow measurement time.	N.A.	N.A.
MDOT	Displays the mass flow.	N.A.	N.A.
+MASS	Displays the forward totalized mass flow.	N.A.	N.A.
-MASS	Displays the reverse totalized mass flow.	N.A.	N.A.
SS up	Displays the signal strength for the upstream transducer.	50-75	<50 or >75
SS do	Displays the signal strength for the downstream transducer.	50-75	<50 or >75
SNDSP	Displays the measured speed of sound in the gas.	N.A.	N.A.
Tup	Displays the upstream ultrasonic signal transit time.	N.A.	N.A.
Tdown	Displays the downstream ultrasonic signal transit time.	N.A.	N.A.
DELTA	Displays the transit time difference between the upstream and downstream signals.	N.A.	N.A.
Tot K	Displays the total K factor.	N.A.	N.A.
PEAK%	Displays the percentage of peak (set to +50 by default).	N.A.	N.A.
Qup	Displays the signal quality for the upstream transducer.	≥1200	-400 to +400
Qdown	Displays the signal quality for the downstream transducer.	≥1200	-400 to +400
AMPup	Displays the value for the signal amplitude of the upstream transducer.	24 ± 5	<19 or >29
AMPdn	Displays the value for the signal amplitude of the downstream transducer.	24 ± 5	<19 or >29
CNTup	Displays the AGC DAC count for the upstream gain setting.	N.A.	N.A.
CNTdn	Displays the AGC DAC count for downstream gain setting.	N.A.	N.A.
P#up	Displays signal peaks for the upstream transducer.	100-2300	<100 or >2300
P#dn	Displays signal peaks for the downstream transducer.	100-2300	<100 or >2300
TEMP	Displays the gas temperature (from 0/4-20 mA input).	N.A.	N.A.
PRESR	Displays the gas pressure (from 0/4-20 mA input).	N.A.	N.A.
AcVOL	Displays actual volumetric flow.	N.A.	N.A.
StVOL	Displays standard volumetric flow.	N.A.	N.A.
Tu S <sup>1</sup>	Displays Skan transit time upstream.	N.A.	N.A.
Td S <sup>1</sup>	Displays Skan transit time downstream.	N.A.	N.A.

Table 10: Available Measurement Parameters (cont.)

Option Bar	Description	Good	Bad
DT S <sup>1</sup>	Displays Skan Delta T.	N.A.	N.A.
Tu M <sup>1</sup>	Displays Measure transit time upstream.	N.A.	N.A.
Td M <sup>1</sup>	Displays Measure transit time downstream.	N.A.	N.A.
DT M <sup>1</sup>	Displays Measure Delta T.	N.A.	N.A.
Vinst	Displays the instantaneous velocity.	N.A.	N.A.
<sup>1</sup> available only if Burst Mode = S/M			

### 3.5.1 Programming the LCD (cont.)

**Note:** *The measurement units that appear in these prompts are those selected in the GLOBL-SYSTM menu earlier in this section. Also, when differences in one channel's programming invalidate an output previously chosen for the other, the measurement defaults to the nearest selectable item in the parameter list.*

The previous two prompts repeat until all of the specified # of LCD Parameters have been set up. When all of the display parameters have been set up, the meter returns to the Global I/O window. To leave the *Keypad Program*, press the [Escape] key three times.

After leaving the *Keypad Program*, the PanaFlow Z1G will reset itself and will begin to display the parameters specified in this section. If more than one parameter was set up, each of the parameters will be displayed in sequence, with a pause of several seconds between display changes.

### 3.5.2 Using the LCD Display

To use the programmed LCD display for obtaining flow rate data, simply power on the PanaFlow Z1G as described earlier in this chapter. Then, read the flow rate directly from the display, as shown in Figure 13 on page 39.

**Note:** *See Chapter 2, Displaying Data, in the Programming Manual to customize the contents of the LCD display.*

### 3.5.3 PanaView Display

Power up PanaView, establish communications with the PanaFlow Z1G and enter the required startup parameters, as described in Chapter 2, *Initial Setup*. Then, proceed as follows:

**Note:** See Chapter 2, *Initial Setup*, in this manual and/or Chapter 1, *Programming Site Data*, in the Programming Manual for complete instructions on entering startup data via PanaView.

1. In PanaView, pull down the *Output* menu, as shown in Figure 15, and click on the *Text Display* option.

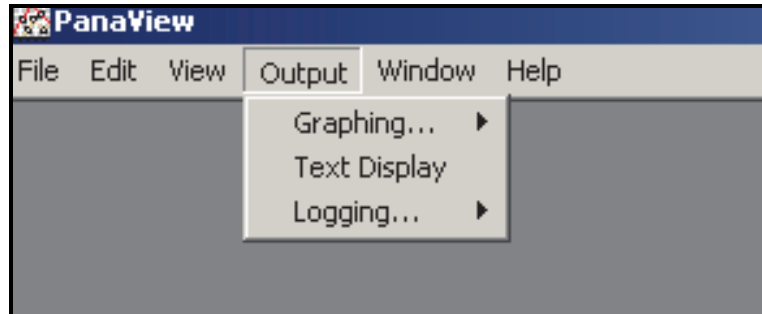


Figure 15 The Output Menu

**Note:** The *Text Display* window that appears after Step 1 is actually stacked on top of any previously opened windows (such as the *Meter Browser* window).

2. Using the *Window* menu, as described in the *PanaView User's Manual*, arrange the open windows in the desired format. For this discussion, Figure 16 shows the *Text Display* window in its maximized (full-screen) size.

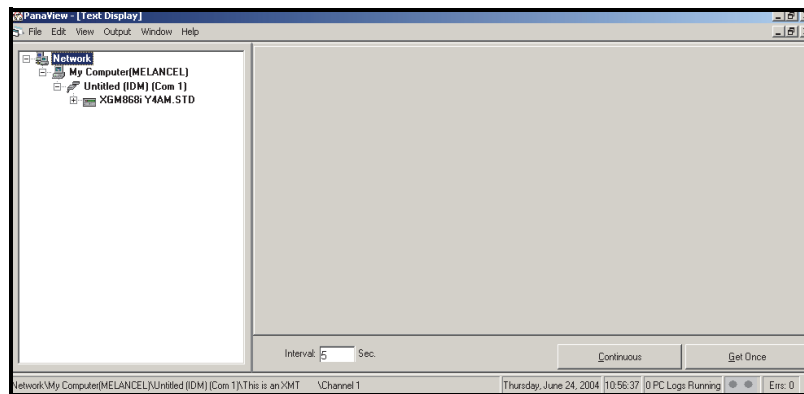


Figure 16 The Text Display Window

3. The left pane of the *Text Display* window contains the standard PanaView network tree. Expand the XGM branch, and double-click on the desired channel. (On 2-channel units, you can also display the SUM, DIFF or AVG parameters.)

### 3.5.3 PanaView Display (cont.)

4. From the expanded tree, double-click on the desired flow parameter to display it in the right pane of the window.
5. Before actual data values can be displayed in the text pane, activate one of the following data collection modes (see Figure 16 on page 44):
  - Click on the [Get Once] option button at the bottom of the right pane in the *Text Display* window. The current value of the selected process parameter, as specified in the PanaView network tree, is displayed in the right pane of the *Text Display* window.

or

- Enter an “interval” in the text box at the bottom of the right pane in the *Text Display* window, or check the “Max. Comm Rate” box to collect readings as fast as the system allows (1 sec). Then, click on the [Continuous] option button to begin collecting data for display in the right pane of the *Text Display* window.

**Note:** *Any value entered in the “Interval” text box is overridden if the “Max. Comm Rate” box is checked.*

The right pane now appears similar to Figure 14 on page 40.

6. If the [Continuous] option was selected in Step 5, click on the [Stop] option button, which has replaced the original [Continuous] option button, to terminate data collection.

The *Text Display* window may be left open while other tasks are performed, or it may be closed by clicking on the lower [X] control button at the far right of the menu bar.

**IMPORTANT:** *If you click on the upper [X] control button at the far right of the PanaView title bar, you will exit PanaView completely.*

### 3.5.3a Displaying Multiple Process Parameters

The procedure for displaying a single process parameter in a text screen may be repeated to simultaneously display multiple process parameters. To do so, proceed as follows:

1. Display the first process parameter in a text screen, as described in the previous section.
2. Repeat Step 1 for any desired additional process parameters, by double clicking on them in the PanaView network tree. PanaView automatically tiles the multiple text screens in the right pane of the *Text Display* window, as shown in Figure 17.

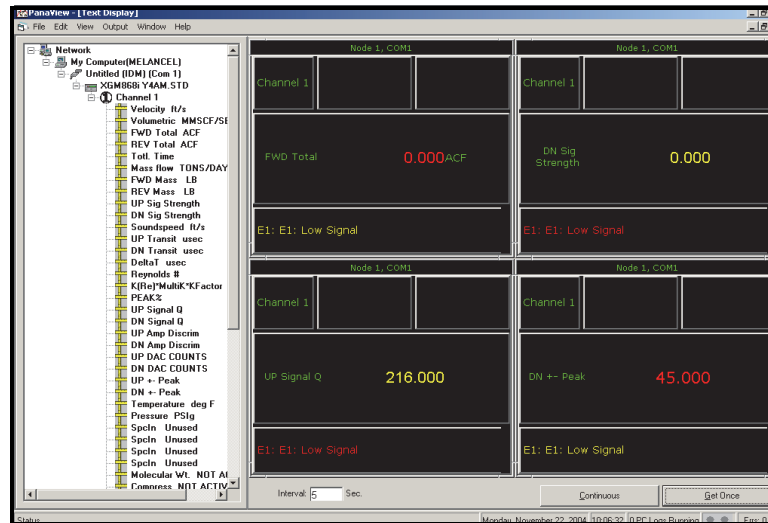


Figure 17 Multiple Text Screens in the *Text Display* Window

3. As in any standard Windows application, the multiple text screens may be resized by dragging their borders. Also, the individual panes within a parameter's text screen may be resized by dragging the borders within that text screen.
4. To close an open text screen, right click anywhere within that screen (except in the title bar or the error section) and click on the [Remove] option that pops up in the context menu.

**Note:** After resizing or removing any of the multiple text screens, the default tiled layout may be restored by opening the *Window* menu (see the PanaView User's Manual) and clicking on the *Tile Output Displays* option.

### 3.5.3b Displaying Multiple Text Windows

The procedures for displaying one or more process parameters in a single *Text Display* window may be repeated to open multiple *Text Display* windows. To do so, proceed as follows:

1. To open another *Text Display* window and display the desired process parameter(s) in the new window, repeat the steps in *PanaView Display*.
2. Arrange the multiple *Text Display* windows as desired via the *Window* menu (see the *PanaView User's Manual*).

### 3.5.4 Pausing Measurement

On occasion, it might become necessary for the PanaFlow Z1G to stop taking measurements. Through PanaView, you can direct the PanaFlow Z1G to pause measurements without cutting off power from the meter.

1. From the meter tree in the *New Meter Browser*, click on the PanaFlow Z1G entry.
2. Expand the *Edit Functions* option, and double-click on the *Pause Measurement* entry. A window opens similar to Figure 18.

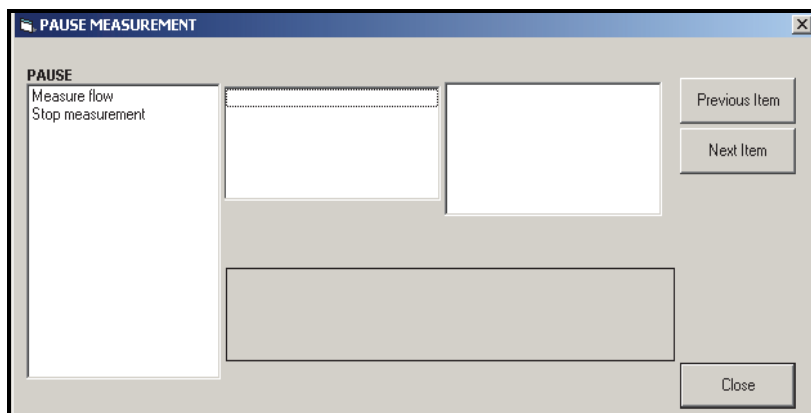


Figure 18 The *Pause Measurement* Window

3. To pause current measurements, double-click on the *Stop measurement* option. The window closes, and the PanaFlow Z1G stops taking measurements.
4. To restart measurement, double-click on the *Pause Measurement* entry, and then on the *Measure flow* option. The PanaFlow Z1G resumes flow measurement.

### 3.5.4a Procedure Options

The *Startup Guide* is intended to provide only those instructions necessary to get the PanaFlow Z1G installed and operating. By following the instructions in this chapter, the Model PanaFlow Z1G can be set up to display the desired channel option and the desired measurement parameter, using either the LCD display or PanaView.

To utilize the more advanced capabilities of the Model PanaFlow Z1G, refer to the *Programming Manual* and/or the *Service Manual* for the instrument. Also, refer to the *PanaView™ User's Manual* for instructions on using the PanaView software with the PanaFlow Z1G.



## Chapter 4. Specifications

### 4.1 General Specifications

The general specifications for the Model PanaFlow Z1G flow transmitter are as follows:

#### 4.1.1 Hardware Configuration

##### 4.1.1a Enclosures:

Standard: Epoxy-coated aluminum Type 4X/IP66

Class 1, Division 1, Groups B C and D

Flameproof ISSeP 02ATEX008

 II 2GD EE d IIC T5 IP66 T95°C

Optional: Stainless steel

#### 4.1.2 Environmental

##### 4.1.2a Process Temperature:

–20° to 80°C

**Note:** *If operating with insulation around the flowmeter, then maximum process temperature may not exceed 65°C.*

##### 4.1.2b Ambient Temperature:

–40° to 50°C)

#### 4.1.3 Velocity Accuracy

##### 4.1.3a % of Reading:

±1.5% of reading 1.5 to 120 FPS

#### 4.1.4 Velocity Range

##### 4.1.4a Bidirectional:

–120 to –0.1 ft/s (–46 to –0.03 m/s)

0.1 to 120 ft/s (0.03 to 46 m/s)

#### 4.1.5 Repeatability

±0.2% to 0.5% of reading

**Note:** *Specifications assume a fully developed flow profile, with a typical straight run of pipe 20 diameters upstream and 10 diameters downstream, and flow velocity greater than 3 ft/s (1m/s). Accuracy depends on pipe size and other factors.*

### 4.2 Electrical Specifications

The electrical specifications for the Model PanaFlow Z1G flow transmitter are as follows:

#### 4.2.1 Power Supply

##### 4.2.1a Options:

*Standard:* 95 to 240 VAC, 50/60 Hz, ± 10%.

*Optional:* 12 to 28 VDC, ±5%.

#### 4.2.2 Power Consumption

20 W maximum

#### 4.2.3 Operating Mode

Correlation Transit-Time™ flow measurement

#### 4.2.4 European Compliance

See the *CE Declaration of Conformity* and the *ATEX Certificate of Compliance* at the back of this manual.

## 4.2.5 Input/Output Specifications

### 4.2.5a Digital Display:

2-line x 16-character, software-configurable, LCD display with LED backlight

### 4.2.5b Digital Communications:

Standard: RS232 serial port for PC, Terminal or Printer

Optional: RS485 serial port for multi-user network

RS485 MODBUS Communications

MODBUS/TCP

Ethernet

Foundation Fieldbus

### 4.2.5c Analog Outputs (built-in):

Two isolated 0/4–20 mA analog outputs, 600  $\Omega$  maximum load

### 4.2.5d Option Cards:

Optional Inputs/Outputs of the following types may be added:

1. *Analog Inputs*: two or four isolated 0/4-20 mA inputs, 24-V loop power.
2. *RTD Inputs*: two or four isolated 3-wire RTD inputs; Span  $-148^{\circ}$  to  $662^{\circ}\text{F}$  ( $-100^{\circ}$  to  $350^{\circ}\text{C}$ )  
Inputs of the following types may be used:
  - a. Temp from  $-40^{\circ}$  to  $500^{\circ}\text{F}$  ( $-40^{\circ}$  to  $260^{\circ}\text{C}$ )
  - b. Pressure from 0–3,000 psig
3. *Analog Outputs*: two isolated 0/4–20 mA analog outputs, 1000  $\Omega$  maximum load
4. *Data Logging*: 128 kB (expandable to 2 MB) of memory

**Note:** The above optional inputs/outputs are available only in specific combinations. Consult the factory for details.

[no content intended for this page]

## Appendix A. CE Mark Compliance

### A.1 Introduction

For CE Mark compliance, the Model PanaFlow Z1G flow transmitter must be wired in accordance with the instructions in this appendix.

**IMPORTANT:** *CE Mark compliance is required only for units intended for use in EEC countries.*

[no content intended for this page]

## Appendix B. Data Records

### B.1 Option Cards Installed

Whenever an option card is installed or changed in the Model PanaFlow Z1G flow transmitter, record the type of card and any additional setup information in the appropriate row of Table 11 below.

**Table 11: Option Cards Installed**

Slot #	Type of Option Card	Additional Setup Information
0	Analog Outputs (A, B)	
1		
2		

## B.2 Setup Data

After the Model PanaFlow Z1G flow transmitter has been installed, setup data must be entered via the *User Program* prior to operation. Record that information in Table 12 below.

**Table 12: Setup Data**

General Information									
Model #				Serial #					
Software Vers.				Setup Date					
Channel - Status									
Channel 1					Channel 2				
Channel Status		Off	Burst		Channel Status		Off	Burst	
Measure Mode		Skat	S/M		Measure Mode		Skat	S/M	
Channel - System									
Channel Label					Channel Label				
Site/Channel Msg.					Channel Message				
Vol. Units					Vol. Units				
Vol. Time Units					Vol. Time Units				
Vol. Dec. Digits					Vol. Dec. Digits				
Totalizer Units					Totalizer Units				
Tot. Dec. Digits					Tot. Dec. Digits				
Mass Flow					Mass Flow				
Mass Flow Time					Mass Flow Time				
MDOT Dec. Dig.					MDOT Dec. Dig.				
Mass Totalizer					Mass Totalizer				
Mass Dec. Dig.					Mass Dec. Dig.				
Channel - Input/Output									
Zero Cutoff					Zero Cutoff				
Temp. Input					Temp. Input				
Base Temp.					Base Temp.				
Pressure Input					Pressure Input				
Base Pressure					Base Pressure				
Low Press. Switch		No	Yes		Low Press. Switch		No	Yes	
Pressure Limit					Pressure Limit				
Channel - SETUP - V Averaging									
Response Time					Response Time				



Table 12: Setup Data (cont.)

<b>Channel - SETUP - Advanced Features - Multi K Factors</b>						
K-Factor #	Velocity	K-Factor		K Factor #	Velocity	K-Factor
1				1		
2				2		
3				3		
4				4		
5				5		
6				6		
7				7		
8				8		
9				9		
10				10		
11				11		
12				12		
13				13		
14				14		
15				15		
16				16		
17				17		
18				18		
19				19		
20				20		
<b>Channel - SETUP - Advanced Features - Mass Flow Calculation</b>						
Mass Flow	Yes	No		Mass Flow	Yes	No
Density Type	Fluid Dens.	Mole. Wgt.		Density Type	Fluid Dens.	Mole. Wgt.
Qact or Qstd?	Actual	Standard		Qact or Qstd?	Actual	Standard
Fluid Density				Fluid Density		
Mole. Weight				Mole. Weight		

Table 12: Setup Data (cont.)

Global - System						
Meter Message				Totalizer Units		
System Units	English	Metric		Tot. Dec. Digits		
Pressure Units				Mass Flow		
Atmos. Pressure				Mass Flow Time		
Vol. Units				MDOT Dec. Digit		
Vol. Time Units				Mass Totals		
Vol. Dec. Digits				Mass Dec. Digits		
Global - Input/Output - Error Handling						
Error Handling				2-Path Error	No	Yes
Global - Communications Port						
Meter Address				MOD. Parity		
Baud Rate				MOD. Stop Bits		
MOD. Baud Rate				MOD. Address		

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## Warranty

Each instrument manufactured by GE Sensing is warranted to be free from defects in material and workmanship. Liability under this warranty is limited to restoring the instrument to normal operation or replacing the instrument, at the sole discretion of GE Sensing. Fuses and batteries are specifically excluded from any liability. This warranty is effective from the date of delivery to the original purchaser. If GE Sensing determines that the equipment was defective, the warranty period is:

- one year from delivery for electronic or mechanical failures
- one year from delivery for sensor shelf life

If GE Sensing determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified by GE Sensing, the repairs are not covered under this warranty.

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**The warranties set forth herein are exclusive and are in lieu of all other warranties whether statutory, express or implied (including warranties or merchantability and fitness for a particular purpose, and warranties arising from course of dealing or usage or trade).**

---

## Return Policy

If a GE Sensing instrument malfunctions within the warranty period, the following procedure must be completed:

1. Notify GE Sensing, giving full details of the problem, and provide the model number and serial number of the instrument. If the nature of the problem indicates the need for factory service, GE Sensing will issue a RETURN AUTHORIZATION NUMBER (RAN), and shipping instructions for the return of the instrument to a service center will be provided.
2. If GE Sensing instructs you to send your instrument to a service center, it must be shipped prepaid to the authorized repair station indicated in the shipping instructions.
3. Upon receipt, GE Sensing will evaluate the instrument to determine the cause of the malfunction.

Then, one of the following courses of action will then be taken:

- If the damage is covered under the terms of the warranty, the instrument will be repaired at no cost to the owner and returned.
- If GE Sensing determines that the damage is not covered under the terms of the warranty, or if the warranty has expired, an estimate for the cost of the repairs at standard rates will be provided. Upon receipt of the owner's approval to proceed, the instrument will be repaired and returned.

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[no content intended for this page]



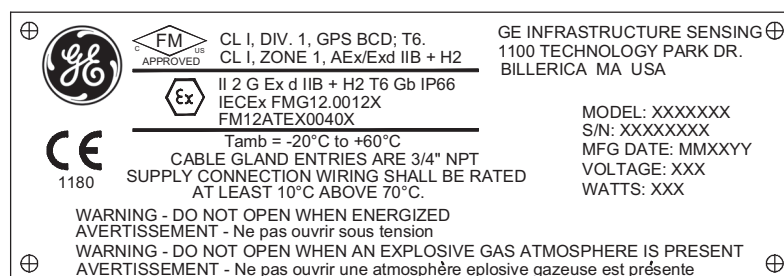
## Certification & Safety Statements for GE Measurement & Control Ultrasonic Flow Transmitters

When installing this apparatus, the following requirements must be met:

- Field wiring shall be rated at least 10°C above 70°C.
- Connecting cables shall be mounted securely and protected from mechanical damage, pulling and twisting.
- Cable entries are 3/4" NPT.
- Cable glands of an approved flameproof design are required. These must be installed according to the manufacturer's instructions. Where the cable glands are provided by GE, the manufacturer's instructions, as supplied, to GE, will be included in the documentation.
- Unused cable entries must be sealed using a certified threaded plug.
- Modifications to the flameproof enclosure are not permitted.
- The apparatus should be de-energized before opening.
- Installation should comply with IEC/EN 60079-14.
- Equipment is of type flameproof "d" design and complies with: EN 60079-0:2009, EN 60079-1:2007, EN 60529:1991 +A1:2000, IEC 60079-0:2011, IEC 60079-1:2007, IEC 60529:2001.
- The product contains no exposed parts which produce surface temperature infrared, electromagnetic ionizing, or non-electrical dangers.
- The product must not be subjected to mechanical or thermal stresses in excess of those permitted in the certification documentation and the instruction manual.
- The product cannot be repaired by the user; it must be replaced by an equivalent certified product. Repairs should only be carried out by the manufacturer or by an approved repairer.
- Only trained, competent personnel may install, operate and maintain the equipment
- The product is an electrical apparatus and must be installed in the hazardous area in accordance with the requirements of the EC Type Examination Certificate. The installation must be carried out in accordance with all the appropriate international, national and local standard codes and practices and site regulations for flameproof apparatus and in accordance with the instructions contained in the manual. Access to the circuitry must not be made during operation.

**Special Conditions for Safe Use:** Consult the manufacturer if dimensional information on the flameproof joints is necessary.

**Markings:** Markings shall appear on the product as shown below:







## Customer Support Centers

### U.S.A.

The Boston Center

1100 Technology Park Drive

Billerica, MA 01821

U.S.A.

Tel: 800 833 9438 (toll-free)

978 437 1000

E-mail: [sensing@ge.com](mailto:sensing@ge.com)

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Sensing House

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